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Conservation Pledge

I give my pledge as an American to save and faithfully to defend from waste the natural resources of my country—its soil and minerals, its forests, waters and wildlife

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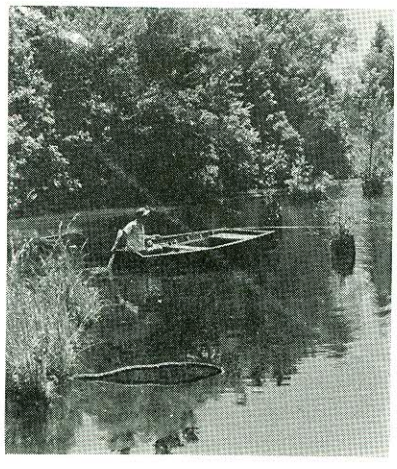

Spring marks the transition from hunting to fishing. Louisiana's lacework of bayous, lakes and streams provide unexcelled fresh water fishing. With the spawning season over, fish are eager to bite. The state offers top bream and crappie fishing, but bass fishing attracts more fishermen. The sulky bass is king of Louisiana waters because of its dogged fighting qualities and aerial tactics when hooked. Moody at times, bass are highly sought. On the other hand, no angler in Louisiana passes up a mess of bream when the opportunity presents itself.
(Photo by Jack Britt)

LOUISIANA Conservationist

LOUISIANA WILD LIFE AND FISHERIES COMMISSION

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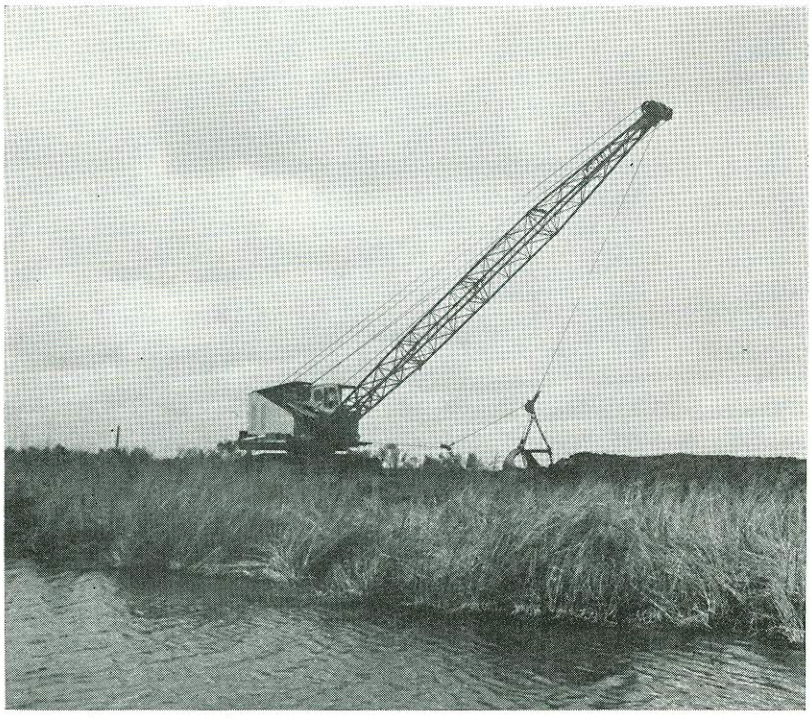
Impoundments Provide



BETTER DUCK HABITAT!

La. Conservationist April 1962

Robert Chabreck

LOUISIANA'S UNIQUE position at the end of the vast Mississippi flyway coupled with its four million acres of coastal marshes make this state one of the major waterfowl wintering areas on the North American continent. During last winter Morton Smith, waterfowl biologist of the Louisiana Wild Life & Fisheries Commission, listed the states total as 4,700,000 ducks in addition to 383,221 geese and 477,100 coots. However, if Louisiana is to maintain its position as a leader in this field, private landowners must make every effort to provide ample facilities for the birds.

Although the Louisiana Wild Life and Fisheries Commission has made extensive efforts along this line, the bulk of the work must be absorbed by the individual. The work of the Commission can be not only a beginning in the right direction, but may also serve as a guide to landowners seeking means of improving their marshes for ducks.

Each year as more and more canals are dug and stream channels deepened for navigation, drainage and pipelines, a new milestone in the history of Louisiana's waterfowl marshes is reached. Their destiny greatly depends upon the planning under which such projects are executed to insure maximum security for all land use practices concerned. Salt water intrusion and tidal action, resulting in excessive flooding and drainage have greatly reduced the productive capacity of vast marsh areas, and unless concerted efforts are made by landowners and sportsmen, the acreage of this habitat will continue to decline. However, with careful planning many such projects can be used to an advantage for waterfowl habitat management.

One management system, which has proven very successful in counteracting this situation and improving habitat conditions for practically all species of ducks wintering in Louisiana, is the use of impoundments. Impoundments are constructed by placing a continuous levee around a certain area then installing the necessary control structures to regulate water levels. Impoundments can be constructed on any marsh area capable of supporting a continuous levee, particularly in Southwest Louisiana, and will provide means of controlling water depth and salinity and, thus, an indirect control of the vegetation.

Coastal marshes in their natural state go through many changes. Certain stages in the change offer a great deal to wintering waterfowl, while other stages are frequently of little value. In addition to the natural plant succession or replacement processes, these changes are greatly affected by climatic factors as well as man's activity. All plants have a definite range of water depth and salinity tolerance, and when conditions escape this range, the plant disappears. Therefore, the goal in any management program is to maintain conditions favorable to the desired species.

The work of the Louisiana Wild Life and Fisheries Commission on Rockefeller Refuge may well serve as a guide to persons interested in this type of management.

Ten separate impoundments totaling 22,600 acres have been constructed on this area since 1954. Detailed ecological studies show that good duck food plants make up 50 percent of the vegetation in the impoundments, while in marsh outside the impoundments good duck food plants made up less than 5 percent of the vegetation.

The impoundments are of three types. The first type is permanently flooded with brackish water from 6 to 18 inches deep and consistently pro-

duces dense stands of widgeongrass. These impoundments are very attractive to all ducks, but especially gadwalls, widgeons and shovellers. The second type is permanently flooded with fresh water from 12 to 24 inches deep, but food production in this type is usually of a lower quality and usage is limited mainly to diving ducks and coots. However, in spite of its low productive capacity this type is maintained as fresh water reservoirs in case of a severe drought. The third type is managed as fresh water systems, but the water levels are manipulated to produce annual grasses. Each year the water is drained from these impoundments in May and the exposed bottom permitted to dry up. This encourages the germination of valuable species such as wild millet and cyperus (nut grass). Then, when the grass reaches a height of 10 to 15 inches the impoundments are reflooded to a depth of 4 to 6 inches. This type of management will produce an abundance of food which is heavily used by mallards, pintails, blue-winged teals and green-winged teals.

Prior to the construction of the impoundments waterfowl inventories listed the duck usage of the 85,000 acre refuge at 75,000 birds, but since the completion of the impoundments, duck usage has increased to 600,000. Although impoundments comprise less than one-fourth of the total area, 80 per cent of the ducks on the refuge are found in the impoundments.

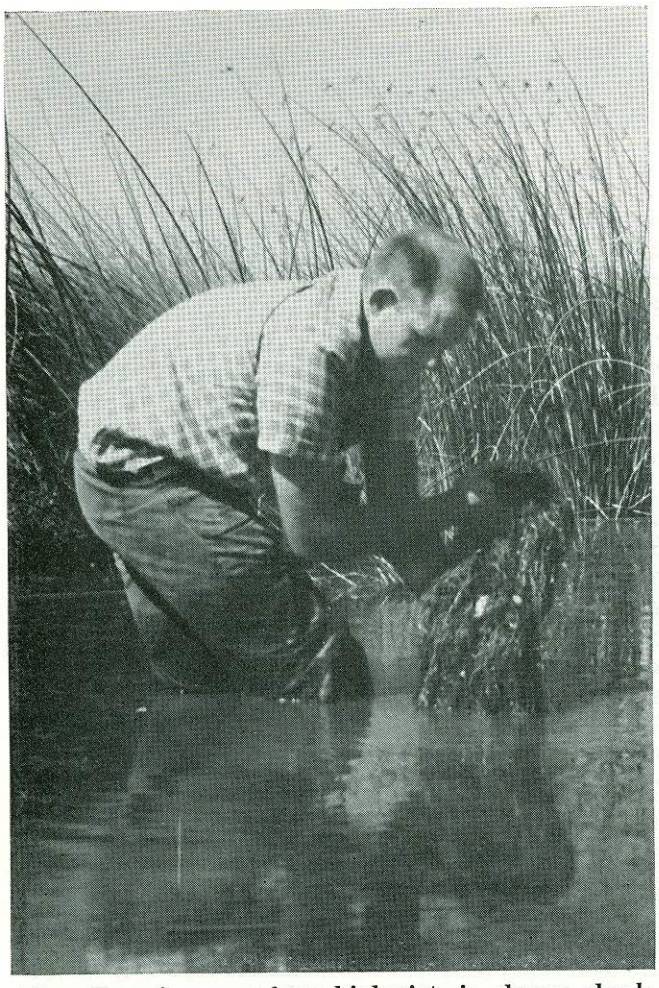
Supplying water for coastal marsh impoundments frequently becomes a problem. Brackish water can be supplied simply by permitting the water to enter on high tides. However, impoundments managed as freshwater systems depend on rainfall. Pumping is not economically feasible on large areas. Also, canals surrounding such areas usually contain brackish water. Fresh water impoundments, which are drained during the early growing season to produce wild millet, present the greatest problem. After germination, adequate moisture is necessary for growth. Without adequate moisture plant growth and seed production suffer. Consequently, reflooding the impoundment at the proper time is of essence.

Reflooding this species with approximately 4 inches of water after it reached a height of 6 to 10 inches produced rapid growth and an abundance of seeds in the impoundments in 1959. However, with a severe drought as in 1960 most of the wild millet germinated but died before reaching maturity. Also, excessive rainfall can be detrimental to the production of annual grasses. Heavy rains during the critical drying period in 1961 hindered germination and resulted in poor production that year.

Impoundments managed to produce widgeongrass may also dry up during severe droughts. However, the writer has observed this species' invasion of brackish ponds within two weeks after reflooding. Also, many barren ponds or ponds which supported no aquatic vegetation produced dense stands of widgeongrass when reflooded, after being completely dry for several weeks. Widgeongrass growth is often limited in such ponds by turbid water, resulting from soft organic clay bottoms and wind action. However, when dry the bottom material cements together and hardens, thus reducing turbidity when reflooded and providing a stable base for plant growth.

When considering the three impoundment management techniques on Rockefeller Refuge, it was apparent that the impoundments permanently flooded with brackish water produced an abundance of high quality duck food most consistently. The permanently flooded freshwater impoundments were dependable but the food produced was of low quality. The fluctuated freshwater impoundments produced an abundance of high qual-

Periodic sampling of aquatic vegetation is one of the duties of refuge biologists. The use of impounded areas where both the level and the salinity can be properly regulated is one of the reasons why Rockefeller Wildlife Refuge is one of the outstanding waterfowl refuges in the world.



Allan Ensminger, refuge biologist, is shown checking the growth of widgeon grass, vital to winter habitat for migratory ducks and coots wintering on the sprawling Rockefeller Wildlife Refuge.

ity food, but without absolute water level control, lean years were inevitable.

The impoundments on Rockefeller Refuge were constructed with draglines by digging canals and using the spoil to form levees. In most cases the canals were placed outside the impoundments. By doing this the canals provided access to different parts of the refuge and served as a refuge boundary marker. In certain areas the canals were placed inside the impoundments.

Most impoundments on the refuges were constructed by contract at a cost ranging between fifteen and twenty cents per cubic yard for levee construction. In many instances costs were reduced by using existing levees along canals dug by oil companies for access. Thousands of acres on private lands in Louisiana have been completely impounded by canal levees or spoil banks and conditions greatly improved for ducks. Other thousands of acres have been partially impounded and would require only short levees and water control structures for completion.

Corrugated metal culverts were installed to provide drainage for the impoundments and to regulate the pool stage. The culverts were treated with a cold tar base preservative and placed in the levee in natural drainage systems. Most of the culverts are 30 inches in diameter and equipped with an overflow structure to keep the impoundment water below a certain level. A lift gate and flap gate were placed on opposite ends of each pipe to facilitate drainage. The flap gates permit water to flow in only one direction through the culverts, so that when the lift gate is raised water will not run into the impoundment on a high tide.

The life expectancy of an impoundment depends on a sound levee system. Levees must be constructed so as to maintain a desired height for the greatest number of years. As evidenced by levees constructed on Rockefeller Refuge, Lewis Nichols reported that in any levee planning careful consideration must be given the problems of levee subsidence and shrinkage. Most coastal marsh soils are semi-fluid material, and this material must not only be used for constructing levees but also serve as a foundation upon which the levee is placed. Also, the moisture content of the marsh soil determines the initial height that a levee may be constructed and the amount of shrinkage that will occur.

Much of the Louisiana coastal marsh is very unstable, particularly in the Southeastern section of the state, and will not support a levee. In such areas impoundments are not practical because of the maintenance problems involved.

Nichols also found that most levee shrinkage takes place during the first year; however, subsidence usually continues throughout the life of the levee. The subsidence rate is controlled by the nature of the marsh soil. The thickness of the surface organic layer determines the rate of

At Rockefeller Wildlife Refuge, the world's most comprehensive alligator research program is being carried on. Thousands of alligators have been live-trapped. Dorsal notching, tagging and continuing observation has brought to light new information about the annual growth, nesting habits, and reproductive capacity of alligators.

This stand of wild millet was produced by utilizing the impoundments. Water is drained off during the late spring and summer months, enabling biologists to produce thick stands of duck food. In the fall and winter months, flooding of the impounded areas creates ideal duck wintering habitat.

immediate subsidence. This layer compresses to approximately 60 per cent of its original thickness. With a complete knowledge of marsh soil conditions, it is possible to predict levee loss, within certain limits.

One or two lifts were usually necessary to raise and reshape a marsh levee after its original construction. This was done after approximately one year and regulated by the ability of the soil to stand at the desired elevation. Under normal conditions no attempt should be made to construct a marsh levee higher than six feet.

In addition to duck management marsh impoundments have other wildlife values which merit consideration. On Rockefeller Refuge the permanently flooded freshwater impoundments have proven very attractive to alligators. Impoundments constructed with a canal inside the area offer ideal conditions for the large reptiles. Both deep and shallow water and an abundant supply of food are available, and the levees provide choice nesting sites. The alligator population of a two-mile canal inside one particular impoundment on Rockefeller Refuge in 1960 was estimated at 600, with sizes ranging from one to nine feet.

In certain coastal areas deer populations have benefited from impoundments. In addition to having permanent fresh water and an increased food supply, the levees provide travel lanes, escape cover and make more areas easily accessible. ✢

SNAKE REMEDY

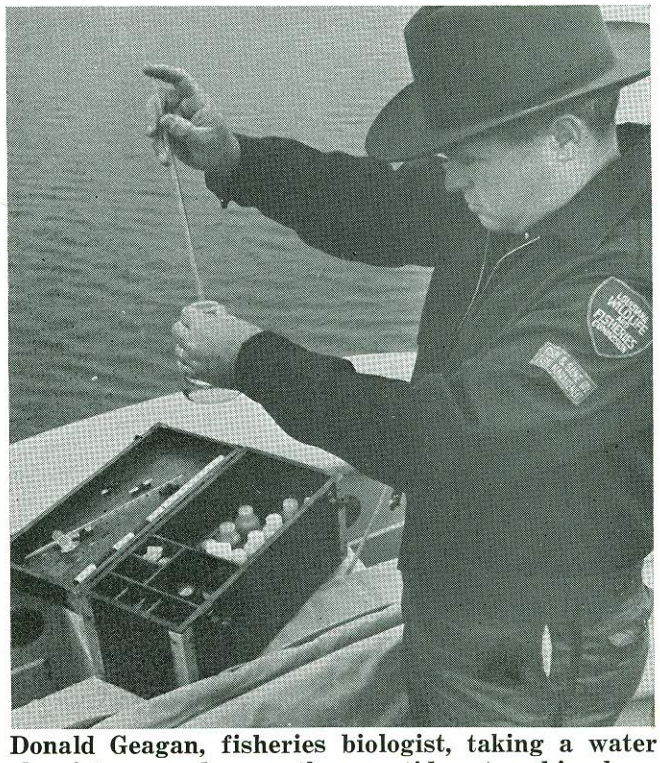
One poor creature who has few friends is the snake. The reasons are obvious, and campers know he's a good critter—to stay away from. When camping in snake-infested country, the wise sportsman will carry a handgun loaded with shotshells. This way, when Mr. Snake gets ready to strike, the camper will have a good chance of blowing him to bits.

COASTAL MARSHES

(Continued from page 7)

conditions it prefers. This is one of the main objectives of the program.

As we said earlier, information on the changing spatial distribution and movements of the fish along the coast is of prime importance. This knowledge coupled with the reasons why they occur would greatly help us in the harvesting of this food and sport resource. And, insofar as future industrial development of this area is con-



Donald Geagan, fisheries biologist, taking a water chemistry sample near the new tidewater ship channel now under construction in St. Bernard Parish. Water salinity greatly influences the distribution of fishes and other organisms in estuarine environments.

cerned, by having information of this type on hand, one might conceivably be able to predict what effect these proposed changes would have on the ecology of the area. If the development might prove to be deleterious, alternative or modified methods could be suggested that would reduce the damage to our natural resources.

It is hoped investigations of the fishery along Louisiana's coast can be continued and expanded after this particular project terminates. I'm sure everyone will agree that further accumulation of knowledge and the practical application of this information from projects such as this can benefit everyone who wants to utilize this natural resource to its fullest extent without destroying it. ✢

CARE FOR WORM

The new plastic-worm lures are fine on the end of a hook, but many an angler has had cause for despair when upon opening his tackle box he has discovered the worms have melted all over everything. It's a sticky situation. Here's the answer. Next time, place your worms in a jar filled with water. The advantages are obvious.